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Selection of government debt evaluation methods based on the concept of sustainability of the debt

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Abstract

Purpose. The main purpose of the paper is to reveal the rationale behind selection of the government debt evaluation methods based on the concept of sustainability of the debt.

Methods. The main research methods used are systematization and generalization of the scientific literature, quantitative and qualitative analysis of the primary and secondary data, scenario method.

Results. Specific different concepts of sustainability of the government debt are defined. The rationale and arguments of the selection of the government debt evaluation methods are provided. The results of the research show that isolated research, based on the separate method, which in turn is selected because of the specific adopted concept of the government debt sustainability, often is not reliable due to limited interpretation of the government debt sustainability. This contradiction can be counterweighed by the systemic approach to the evaluation of the government debt sustainability.

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Keywords: Government Debt; Debt Evaluation; Debt Evaluation Methods; Debt Sustainability; Government Debt Sustainability Concept.

Introduction

Government's borrowing needs, debt management and debt-associated risk management are analyzed by Knedlik & Von Schweinitz (2012), Gatzert & Martin (2012), Melecky (2012), Agliardi, *et al.* (2012), Duan & Van Laere (2012), Baldacci, *et al*. (2011), Korinek (2011), Bordo, *et al*. (2010), Fuentes & Saravia (2010), Vlasenko *et al.* (2009), Genberg & Sulstarova (2008), Tomz & Wright (2007), Drudi & Giordano (2000). The impact of government borrowing on the country's economy is examined by Moinescu (2013), Faraglia, *et al.* (2013), Legrenzi & Milas (2012), von Wijnbergen & France (2012), Taylor, *et al.* (2012), Eggertsson & Krugman (2012), Molănescu

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& Aceleanu (2011), Aspromourgos, *et al*. (2010), Liliko, *et al.* (2009), Neck & Sturm (2009), Cebula (2002), Burnside (2004), Douglas, *et al*. (1998). Various government debt sustainability assessment methodologies are considered by Faraglia, *et al.* (2013), Campa (2012), Barkbu, *et al*. (2012), Teica (2012), Chen (2011), Byrne, *et al*. (2011), Sacuragawa & Hosono (2010), Hajdenberg & Romeu (2010), Vlasenko & Kozlov (2009), Frank & Ley (2009), Neck & Sturm (2009), Sopek (2009), Yusof *et al*. (2008), Genberg & Sulstarova (2008), Kudrin (2007), Andrés, *et al.* (2006), Telatar, *et al.* (2004), Rotemberg (2003), Uctum & Wickens (2000).

In general, in scientific literature there is no consensus, what are the government's debt sustainability criteria and assumptions for sustainable debt. Various authors provide very different and distinct concepts of government debt sustainability and presumptions for government debt sustainability.

Depending on those presumptions, various government debt sustainability evaluation methods can be used. Significant lack of this kind of research is evident. Specific definition of the sustainability of the debt stipulates both the approach and technique of the respective debt evaluation. The problem often arises in choosing the right definition-technique match and interpretation of the results.

Therefore, the main purpose of the paper is to reveal the rationale behind the selection of the government debt evaluation methods based on the concept of sustainability of the debt. The case of Lithuania is analyzed.

In the paper, basic systematization of the government debt evaluation methods is provided. The peculiarities of the concept of sustainability of the debt are proposed. Different approaches on the subject (the concept of sustainability of the debt) are analyzed and their pros and cons are provided as well. The main research methods used are systematization and generalization of the scientific literature, quantitative and qualitative analysis of the primary and secondary data, scenario method.

1. Diversity of concepts of the government debt sustainability

Taking into account researches of Campa (2012), Barkbu, *et al.* (2012), Teica (2012), Chen (2011), Byrne, *et al*. (2011), Sacuragawa & Hosono (2010), etc., in general, the government debt often is explained as a whole of unpaid government debts. Commonly, it is defined by the amount of money or as the ratio to GDP. The government debt also can be described as incurred by country's highest executive authority or a central government, which is authorized to work on behalf of the state and operates by the principle of collegiality.

Next we present five main principle approaches to the government debt sustainability concept. The main concepts are formed, based on the researches of Faraglia, *et al.* (2013), Campa (2012), Barkbu, *et al*. (2012), Teica (2012), Chen (2011), Byrne, *et al*. (2011), Sacuragawa & Hosono (2010), Hajdenberg & Romeu (2010), Vlasenko & Kozlov (2009), Frank & Ley (2009), Neck & Sturm (2009), Sopek (2009), Yusof *et al*. (2008), Genberg & Sulstarova (2008), Kudrin (2007), Andrés, *et al.* (2006), Telatar, *et al.* (2004), Rotemberg (2003), Uctum & Wickens (2000) etc.

Popular indicator for the sustainability of government's debt is solvency of the government. The government debt is considered to be sustainable if government is solvent. This approach is quite abstract and extensive additional analysis must be done to support the results. Also, often evaluation of the solvency and the reasoning behind the solvency concept is complicated on its own. Although, in some cases there is no time period given, it makes no sense to take into consideration short period, as the general concept of any sustainability presupposes that only long run should be considered and estimated.

Other approach is based on the evaluation of the debt burden. Government debt is considered to be sustainable if debt induced debt burden is not increasing. In this case, evaluation results are quite specific and in our opinion, only long run results should be considered as well. Basic ratio based analysis would reflect the burden level. It is argued that it can somewhat be said, that the government's borrowing policy is not sustainable, if, over time, the debt of the government has significantly increased – or an increase is likely to occur in the nearest future – and the debt service costs are escalating. However, it would be more accurate to say, that the government's borrowing policy is not sustainable if, over time, an uncontrollable increase of a debt is noticed and the government is no longer able to meet its debt obligations. Therefore, forecasting and simulation methods would be appropriate.

Next concept is somewhat similar, but takes into consideration not the debt burden itself, but the level of debenture and its dynamics over time. Government debt can be considered as sustainable if it is possible to control

the variation of the debenture level. Management of government debt associated risk is estimated and evaluated. Simulations and stress test based methods should be used for this type of the research.

The fourth principle approach deals with the budget limitations. In this case, government debt is considered to be sustainable if borrowing and thus the debt level does not exceed the economy increase. Although the respective research method directly does not require consideration of the economic uncertainty, it is necessary to evaluate it for the estimation of the change of the GDP.

The last principle considers the effectiveness of the usage of the borrowed funds. The borrowing strategy is considered to be based on the sustainability principles if the borrowed funds are used effectively. Effectiveness can be measured using specific indicators, but the reasoning behind the indicators must be concrete.

The diversity of the concepts highlights the different aspects of the sustainability essence. However, in our opinion, when considering the specific case, integral approach must be taken. For example, generalization of the different concepts of government debt sustainability is reflected in the concept approach, suggested by Draksaite (2014). The concept generalizes different concepts of sustainable government debt, respective methodology of evaluation of sustainability of government debt, the peculiarities of government borrowing and prerequisites for sustainable borrowing of government. According to it, the composition of a sustainable government debt portfolio is such selection of borrowing and debt management means, considering debt-associated risks (e.g. risk of a sudden economic decline, change of exchange rates, refinancing etc.) and borrowing costs, which in the long-run allows meeting government's borrowing needs, sustain creditability and sustain the ability to meet its obligations to creditors. The sustainable government debt is understood as such level of the government debt, resulted from the governmental debt management, which ensures meeting the government borrowing demands and which does not negatively affect creditability of the government and the ability to meet the long-term debt obligations. The approach is based solely on the management of the present and future debenture and is not based on the formation and impact of the borrowing extent defining factors.

2. The rationale of the main government debt evaluation methods

In most cases the government debt management is considered under a relatively stable economic environment or anticipated economic changes. The sustainability of government debt is often evaluated by taking into account the retrospective dynamics of certain statistical indicators (Goldstein, 2010; Presbitero & Arnone, 2006). In our opinion, such approach is absolutely wrong given the uncertainty and the stochastic nature of economy.

Some of the authors the government's ability to repay debt link to the debt structure peculiarities (Melecky, 2012; Consiglio & Staino, 2012; Date *et al*., 2011; Milne, 2011; Choi *et al*., 2010). Lately, however, it is increasingly recognized that in applied economic and financial models, the accuracy of the results is strongly influenced by the use of random variables (Consiglio & Staino, 2012; Date *et al*., 2011; Sacuragawa & Hosono, 2010; Hajdenberg & Romeu, 2010; Frank & Ley, 2009; Ferrarini, 2009; Budina & van Wijnbergen, 2009; Tanner & Samake, 2008; Genberg & Sulstarova, 2008; Yusof *et al*., 2008) and complex analysis debt indicators (Knedlik & Von Schweinitz, 2012; Sopek, 2009). These methods are increasingly being used as an effective tool to assess and predict the risk of debentures. But methods, considering stochastic nature of the economy, are extensively being used for evaluation of sustainability of government debt only in the last decade. However, even in current economics, stochastic nature of economy is not always taken into the consideration when evaluating the strategy of government's borrowing.

Our research into the different methods for government debt sustainability estimation show, that there are wide variety of conceptually different methods, according to which the sustainability of a government's debt can be estimated. For example, the ratio of debt to GDP or its dynamics is widely used by many economists and politicians. But the problem is that on itself it does not actually estimate or even reflect the sustainability of a government's debt.

Also, the sustainability of the government portfolio is usually related to the solvency of a debtor during the repayment. We argue that this approach should be complemented by the long run view on the evaluation of the solvency of the government.

Nevertheless, based on the theoretical and empirical evidence, the sustainability can be estimated by simultaneously invoking complex and more accurate indicators. It can be argued that complex analysis of the

government's debt sustainability factors better indicate the sustainability or lack of it. Therefore, lately, in order to estimate the sustainability, models, allowing a complex assessment of the debt, are used more extensively.

In relevance of the concept of debt sustainability, other main methods for evaluation of the sustainability of the government debt are: evaluation of risk management; evaluation of borrowed fund usage; evaluation of debt level, interest or debt servicing cost level etc.; evaluation of debt portfolio structure; evaluation of fiscal or/and monetary policy etc.

According to our study, in current economic environment, means for debt-associated risk management (i.e. means that allow indication and measurement of the risk level; such as VaR based methods, stress testing etc.) should be commonly used in order to evaluate the sustainability of government debt. Also, these means and risk prevention/control means (such as hedging, setting of debt limits etc.), if applied correctly, allow controlling of the debt level and prevent against economic loss in case of adverse changes in borrowing market. Although the latter (risk prevention/control) means are relatively expensive, economic benefit of using them is obvious.

Given the research results and the stochastic nature of the economy, the basis of the sustainability of a government's debt should be complex analysis of the factors, influencing the debt sustainability. Also, because of the same reason, we argue, that such analysis must be based on the usage of stochastic methods.

3. The integrity between selection of the government debt evaluation method and interpretation of the results

The results of the government debt evaluation depend on the adopted concept of the sustainability, used method and the overall interpretation of the results in the context of the two factors.

Nevertheless, the method should be selected according to the adopted and well-reasoned approach on the concept of government debt sustainability. Otherwise, the results would be neither representative, nor matching the primal problem. In case of every analyzed government debt sustainability concept, it is eminently important to define the specific evaluation limitations and to generalize the results only within the reliability range. Also, as different sustainability evaluation method usually represents the sustainability concept-based results, considering the integral approach, the systemic research should be applied whenever it is possible.

In our research, we have analyzed the case of Lithuania and evaluated its government debt sustainability based on all the different debt sustainability concepts, except the effectiveness of the usage of the borrowed funds, and respective method. 2004-2014 year period was chosen for the research, quantitative and qualitative analysis of the secondary statistic and primary results-based data has been performed. Specifics of the Lithuania's government borrowing were revealed during the extensive qualitative analysis of the peculiarities of the specific economy, evaluating various aspects of causes, composition and management of the government debt (within the research limits). Systemic approach of the results has been employed. Borrowing extent defining factors or their management was not considered in the research. The main results are discussed below.

The results of the empiric research showed that there is no risk of changes in exchange rate. The risk of change of interest rates and the risk of liquidity (refinancing) are considered to be the biggest threat (in relevance to manageable risks). The risk of interest rate changes is a minor threat to the sustainability of the Lithuanian government's debt, as the major part of the debt has fixed interest rates.

Assessing the sustainability of the government debt as an ability to meet the financial obligations, and given the ratio of the government debt to GDP, and having assumed that the increase of the ratio of the debt to GDP will not change, the government debt can be considered sustainable. However, since 2009, the rates of the GDP increase are lower than the rates of the government debt increase. So, assessing the sustainability at this respect, the government debt can be considered sustainable only in case if the rates of GDP increase will exceed the rates of debt increase (the situation until the global financial crisis of year 2008-2009).

In regard of the rates of government debt increase in respect to the rates of the debt management costs, the government debt can be considered sustainable if the tendencies of the change of debt management cost remain the same or improve. Integral evaluation of the dynamics of primary deficit, the net borrowing of the central government, dynamics of GDP, the debt of central government, the cost of interest rates, the ratio of the central government debt to GDP and the declared top priority of the government's borrowings (refinancing of the debt and the need to reduce the budget deficit to meet the Maastricht criteria), showed that, assuming that the central government debt obligations are met on time, it can be assumed that the biggest influence to the sustainability of the

central government's debt during the analysed period was made by the increase of debt cost due to the global financial crisis, and rather not due to the debt management decisions. Also, we have established that interest cost is the main factor, causing increase of the deficit of the central government.

It was established that the risk of refinancing in Lithuania is reduced by coordinating (in advance) the dates of payment to creditors and government's borrowing in the market. Also, cumulating of financial resources is planned in advance. The combination of these measures is often used. In general, based on the systematic approach to the results, we argue that long term government debt management principles are based on the principles of the sustainability.

Conclusions

Every concept of the government debt sustainability stipulates the use of the appropriate method. The use of inadequate methods most probably might result in inapplicable and/or incorrect generalization. Nevertheless, although separate methods can be used to obtain representative results within the reliability limits, systemic approach must be employed when evaluating the sustainability of the government debt. Especially this is evident in the uncertain economic environment.

The use of deterministic methods contradicts to the rationale behind the evaluation of the debt in the stochastic economy environment. Therefore, such methods cannot be used for evaluation of the sustainability of government debt. Instead, only the methods, evaluating the stochastic nature of the economy, should be employed.

Considering the concept of debt sustainability, the main methods, used to evaluate the sustainability of government debt, are the following: evaluation of risk management; evaluation of debt-associated risk; evaluation of government's solvency; evaluation of borrowed fund usage; evaluation of debt level, cost level etc.; evaluation of government debt portfolio structure; evaluation of fiscal or/and monetary policy. The basis of the evaluation of the sustainability of a government debt should be based on integral analysis of the factors, influencing the debt sustainability.

Integral evaluation of Lithuanian government debt sustainability evaluation results revealed that long term borrowing strategy principles are based on the concepts of the sustainable borrowing.

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